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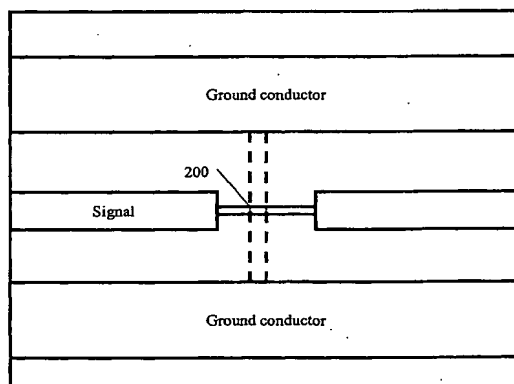
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(54) Title: **FERROELECTRIC VARACTORS SUITABLE FOR CAPACITIVE SHUNT SWITCHING**



(57) Abstract: A ferroelectric varactor suitable for capacitive shunt switching is disclosed. High resistivity silicon with a SiO<sub>2</sub> layer and a patterned metallic layer deposited on top is used as the substrate. A ferroelectric thin-film layer deposited on the substrate is used for the implementation of the varactor. A top metal electrode is deposited on the ferroelectric thin-film layer forming a CPW transmission line. By using the capacitance formed by the large area ground conductors in the top metal electrode and bottom metallic layer, a series connection of the ferroelectric varactor with the large capacitor defined by the ground conductors is created. The large capacitor acts as a short to ground, eliminating the need for vias. The concept of switching ON and OFF state is based on the dielectric tunability of the ferroelectric thin-films. At 0 V, the varactor has the highest capacitance value, resulting in the signal to be shunted to ground, thus isolating the output from the input. This results in the OFF state of the switch. By applying a small voltage to the center conductor of the CPW, the varactor's capacitance can be reduced allowing the signal to be transmitted through resulting in the ON state of the device. Such a varactor shunt switch eliminates majority of problems plaguing the RF MEMS shunt switches.



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